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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FABIO CASATI,
MING-CHIEN SHAN,
LI-JIE JIN,
UMESHWAR DAYAL, and
DANIELA GRIGORI

Appeal 2009-004505
Application 10/057,143
Technology Center 3600

Decided: April 26, 2010

Before HUBERT C. LORIN, ANTON W. FETTING, and
JOSEPH A. FISCHETTI, *Administrative Patent Judges*.
FETTING, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

2 Fabio Casati, Ming-Chien Shan, Li-Jie Jin, Umeshwar Dayal, and
3 Daniela Grigori (Appellants) seek review under 35 U.S.C. § 134 (2002) of a
4 final rejection of claims 15-26, the only claims pending in the application on
5 appeal.

6 We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b)
7 (2002).

SUMMARY OF DECISION¹

9 We AFFIRM.

THE INVENTION

11 The Appellants invented an exception analysis, prediction, and
12 prevention method and system (Specification 2: FIELD OF THE
13 INVENTION).

14 An understanding of the invention can be derived from a reading of
15 exemplary claim 15, which is reproduced below [bracketed matter and some
16 paragraphing added].

17 15. A method for predicting exceptions in a workflow instance
18 comprising:

[1] preparing data from past workflow executions;

¹ Our decision will make reference to the Appellants' Appeal Brief ("App. Br.," filed July 14, 2008) and Reply Brief ("Reply Br.," filed November 4, 2008), and the Examiner's Answer ("Ans.," mailed September 4, 2008).

1 [2] generating at least one exception prediction model based on
2 the prepared data;
3 [3] using the exception prediction model
4 to generate at least one prediction of an exception
5 before the exception occurs for a current instance of the
6 workflow instance; and
7 [4] performing an action
8 during execution of the workflow instance
9 to avoid occurrence of the exception in the workflow
10 instance.

11

12 THE REJECTIONS

13 The Examiner relies upon the following prior art:

14 Casati et al., *Specification and Implementation of Exceptions in*
15 *Workflow Management Systems*, ACM Transactions on Database
16 Systems, Vol. 24, No. 3, pp. 405-451, September 1999

17 Claims 15-26 stand rejected under 35 U.S.C. § 101 as directed to non-
18 statutory subject matter.

19 Claims 21 and 22 stand rejected under 35 U.S.C. § 112, first paragraph,
20 as not enabling a person of ordinary skill in the art to make and use the
21 claimed subject matter from the original disclosure.

22 Claims 15-26 stand rejected under 35 U.S.C. § 102(b) as anticipated by
23 Casati.

24

ARGUMENTS

4 The Examiner found that the claims were neither tied to another
5 statutory class and did not transform underlying subject matter. Ans. 3-5.
6 The Appellants argue that an action is performed during execution to avoid a
7 predicted exception. Reply Br. 2.

8 *Claims 21 and 22 rejected under 35 U.S.C. § 112, first paragraph, as not*
9 *enabling a person of ordinary skill in the art to make and use the claimed*
10 *subject matter from the original disclosure.*

11 The Examiner found that these claims recite selectively removing input
12 data, but the Specification provides no disclosure as to how such selection
13 occurs. Ans. 5. The Appellants argue that the Specification provides
14 examples at 14:22-28. Appeal Br. 10-11.

15 *Claims 15-26 rejected under 35 U.S.C. § 102(b) as anticipated by Casati.*

16 The Appellants argue that Casati only reacts to exceptions after the
17 exception occurs and so does not predict exceptions before they occur.
18 Appeal Br. 12-13.

ISSUES

20 The issue of whether the Examiner erred in rejecting claims 15-26 under
21 35 U.S.C. § 101 as directed to non-statutory subject matter turns on whether
22 the claims pass the machine or transformation test.

23 The issue of whether the Examiner erred in rejecting claims 21 and 22
24 under 35 U.S.C. § 112, first paragraph, as not enabling a person of ordinary

1 skill in the art to make and use the claimed subject matter from the original
2 disclosure turns on whether the Specification adequately discloses how to
3 select input data for removal.

4 The issue of whether the Examiner erred in rejecting claims 15-26 under
5 35 U.S.C. § 102(b) as anticipated by Casati turns on whether Casati
6 describes predicting an exception before it occurs and performing an action
7 that avoids the exception.

8 **FACTS PERTINENT TO THE ISSUES**

9 The following enumerated Findings of Fact (FF) are believed to be
10 supported by a preponderance of the evidence.

11 *Facts Related to Appellants' Disclosure*

12 01. The Specification defines “workflow” as the automation of a
13 business process, in whole or in part, during which documents,
14 information, or activities are passed from one participant to
15 another, according to a set of predefined rules. Specification 2:16-
16 18.

17 02. The Specification defines “exception” as any problem or
18 situation of interest, defined by the designers and administrators,
19 that is to be addressed and possibly avoided. Specification 9:21-
20 23.

21 03. The Specification describes using the mining and interpretation
22 phases of its exception analysis
23 to identify the most interesting and effective
24 classification rules. In particular, the mining phase may
25 generate classification rules that classify process

1 instances based on attributes that are not interesting in the
2 specific case being considered. For example, when an
3 obvious and not interesting correlation is generated, an
4 analyst may want to repeat the mining phase and
5 selectively remove one or more attributes from the ones
6 considered in generating the classification rules, so that
7 the classifier can focus on more meaningful attributes.
8 Specification 14:20-17.

9 04. The Specification further describes that in using the mining and
10 interpretation phases of its exception analysis

11 the classification rules will identify a correlation between
12 the process instance duration and a deadline expiration
13 exception. However, this is an obvious and not very
14 interesting correlation. Consequently, an analyst may
15 repeat the mining phase and remove the process instance
16 duration attribute from the attributes considered in
17 generating the classification rules. In this manner, the
18 classifier can focus on more interesting attributes.
19 Specification 14:20-17.

20 *Facts Related to the Prior Art*

21 *Casati*

22 05. Casati is directed to handling exceptions, *i.e.*, asynchronous and
23 anomalous situations that fall outside the normal control flow, in
24 workflow management systems. Casati 405: First ¶.

25 06. Casati describes representing exceptions that alter the normal
26 flow of processes and in particular, expected exceptions which are
27 those anomalous situations that are known in advance to the
28 workflow designer. Casati 406: Second ¶.

- 1 07. When an exception is unexpected, an exception handler
- 2 typically resorts to halting the process and invoking a human
- 3 intervention. Instead, when exceptions are expected, the exception
- 4 handler can rely on the semantics of the workflow application in
- 5 order to handle the exception, typically by means of some form of
- 6 reactive processing. Casati 406: Second ¶.
- 7 08. Casati describes expected exceptions as unpredictable, and
- 8 therefore cannot be conveniently represented in the process in the
- 9 form of special tasks and connections among tasks. They are not
- 10 frequent, but once they occur they may require special treatment,
- 11 which may lead to the execution of a completely different process.
- 12 They are asynchronous and highly influenced by external factors.
- 13 Their execution may cause the backtracking of previous steps in
- 14 the process or even sudden termination. Casati 406: Third ¶.
- 15 09. Casati describes a comprehensive approach to the management
- 16 of expected exceptions by integrating the exception handler with
- 17 the workflow manager. Casati 406: Fourth ¶.
- 18 10. Casati describes how the exception handling mechanism must
- 19 be able to capture exceptional events and to react to them. Each
- 20 reaction must first assess the state of the process and then, in a few
- 21 cases, adopt the corrective action; in many cases events
- 22 correspond to false alarms and do not need to be followed by a
- 23 corrective action. Casati 407: First full ¶.
- 24 11. Casati describes how active rules are used to control expected
- 25 events. An event part defines the symptoms of an exception. A

condition, a Boolean predicate that checks that the symptoms really identify an exception to be managed, is used to select the most adequate alternative to deal with the current workflow state.

An action describes the updates and procedures that must be invoked to respond to the exception. Casati 407: Second full ¶.

12. In Casati, the condition part of a rule verifies that rule triggering really corresponds to an exception that needs to be processed. Conditions and actions normally share variables; when the evaluation of the condition produces bindings for these variables, the condition is satisfied, thus identifying the objects that are affected by an exception. Casati 415: ¶ 3.2.2.

13. Each workflow event causes triggers to be inserted into a table. Those events are then analyzed. As conditions are met and actions are called for those conditions and actions are translated into code for a query. Casati 424.

ANALYSIS

Claims 15-26 rejected under 35 U.S.C. § 101 as directed to non-statutory subject matter.

19 The claims are nominally directed to processes. The test for
20 determining whether a claimed process is a statutory process under
21 §101 is the *Bilski* machine-or-transformation test, that is:

[T]he proper inquiry under § 101 is not whether the process claim recites sufficient “physical steps,” but rather whether the claim meets the machine-or-transformation test.^{FN}25 As a result, even a claim that recites “physical steps” but neither recites a particular machine or apparatus, nor transforms any

1 article into a different state or thing, is not drawn to patent-
2 eligible subject matter. Conversely, a claim that purportedly
3 lacks any “physical steps” but is still tied to a machine or
4 achieves an eligible transformation passes muster under § 101

5 *In re Bilski*, 545 F.3d 943, 961 (Fed. Cir. 2008) (en banc).

6 The claimed processes satisfy the machine prong of the *Bilski* machine-
7 or-transformation test. The claims perform an action during execution of a
8 workflow instance to avoid occurrence of the exception in the workflow
9 instance. A workflow is defined in the Specification as the automation of a
10 business process. FF 01. Therefore the claims recite performing an action
11 within an automated process that avoids the occurrence of an exception in
12 that automated process. Such an action alters the control and process flow
13 of the process executed within the machine and therefore recites an
14 algorithm that specifically alters even a general purpose computer into a
15 specific machine.

16 The claimed processes therefore pass the *Bilski* machine-or-
17 transformation test. The Examiner did not make any further findings that
18 would render the claims not patent eligible.

19

20 *Claims 21 and 22 rejected under 35 U.S.C. § 112, first paragraph, as not*
21 *enabling a person of ordinary skill in the art to make and use the claimed*
22 *subject matter from the original disclosure.*

23 The question before us here is whether one of ordinary skill would know
24 how to make the selection in claims 21 and 22 reciting selectively removing
25 input data to refine the classification rules. The Specification describes
26 doing so to remove attributes from those considered so as to focus on more

1 meaningful attributes. FF 03. The Specification goes on to describe
2 selecting those attributes that simply correlate obvious and not very
3 interesting pair of parameters. FF 04. The selection in claims 21 and 22
4 only require one of ordinary skill to identify input data that are not
5 particularly interesting to that person's analysis. This is easily within the
6 level of ordinary skill in workflow analysis. Accordingly, the Specification
7 provides a sufficiently enabling disclosure for these claims.

8

9 *Claims 15-26 rejected under 35 U.S.C. § 102(b) as anticipated by Casati.*

10 "A claim is anticipated only if each and every element as set forth in the
11 claim is found, either expressly or inherently described, in a single prior art
12 reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628,
13 631 (Fed. Cir. 1987). "When a claim covers several structures or
14 compositions, either generically or as alternatives, the claim is deemed
15 anticipated if any of the structures or compositions within the scope of the
16 claim is known in the prior art." *Brown v. 3M*, 265 F.3d 1349, 1351 (Fed.
17 Cir. 2001). "The identical invention must be shown in as complete detail as
18 is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d
19 1226, 1236 (Fed. Cir. 1989). The elements must be arranged as required by
20 the claim, but this is not an *ipsissimis verbis* test, *i.e.*, identity of terminology
21 is not required. *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990).

22 The Appellants argue claims 15 - 22 as a group and so we select claim
23 15 as representative. In matching Casati to claim 15, we first examine the
24 scope of claim 15. This claim creates a model for predicting what might
25 occur based upon past workflow actions and uses that model to predict an

1 exception before the exception occurs and performs an action to avoid
2 occurrence of the exception in the current workflow instance. We now turn
3 to finding how Casati implements such analysis.

4 Casati is in fact directed to handling exceptions. Such exceptions alter
5 the normal flow of processes. FF 05. Some of these exceptions are
6 expected in that they are known in advance to the workflow designer. FF
7 06. When exceptions are expected, an exception handler can rely on the
8 semantics of the workflow application to handle the exception, by reactive
9 processing. In the absence of such reactive processing, an exception handler
10 typically resorts to halting the process and invoking a human intervention.
11 FF 07-08.

12 Casati provides a comprehensive approach to managing expected
13 exceptions by integrating the exception handler with the workflow manager.
14 FF 09. Casati's solution captures exceptional events and reacts to them.
15 Each reaction first assesses the process state and if necessary adopts
16 corrective action. FF 10.

17 As Casati monitors workflow progress, active rules are used to control
18 expected events. An event part identifies the symptoms; a Boolean
19 condition checks that the symptoms identify an exception to be managed.
20 The condition is then used to select the most adequate alternative to deal
21 with the current work flow state. FF 11-12.

22 To find how Casati anticipates claim 15, we must first construe the term
23 "exception" to see how Casati reacts to an exception. The Specification
24 defines an exception as any problem or situation of interest. FF 02. The
25 Examiner found that Casati's exception class reacted to condition storing

1 workflow execution such that an exception could be avoided. Ans. 7. *See*
2 exception Casati describes that meets the Examiner's criteria is that of
3 halting the process and invoking a human intervention. FF 06. Such an
4 event meets the definition of being a problem or a situation of interest.

5 Thus, Casati prepares data from past workflow executions by entering
6 events into its system, and generates an exception prediction model by
7 monitoring its triggers looking for such exceptions. Casati uses this
8 exception prediction model by applying its rules to invoke an exception
9 handler, thereby predicting an exception that would terminate the process
10 absent the exception handler processing. The exception handler, in turn
11 adopts corrective action, to avoid occurrence of the exception that would
12 terminate processing.

13 The Appellants' argument that Casati only reacts to exceptions after an
14 exception occurs is not commensurate with the scope of the claim. The
15 Appellants apparently equate the event that triggers the exception handler
16 with the claimed exception. The claim does not limit the nature of the
17 exception, and the disclosed definition is very broad. Thus, as the Examiner
18 found, the prospective event of process termination is also an exception
19 within the scope of claim 15. Accordingly, given the breadth of the term
20 exception, we conclude that Casati anticipates claim 15.

21 The Appellants' argument that Casati describes such events as
22 unpredictable is essentially a component of the above argument, suggesting
23 that unpredictability supports the idea that the reaction is post event. But
24 again, once such an event requiring an event handler occurs, it is quite

1 predictable that absent remedial event handler action, a future exception of
2 termination will occur.

3 The Appellants repeat the arguments in support of claim 15 for the
4 claims 23-25 (Br. 15-16) and we find those arguments unpersuasive for the
5 same reasons.

6 Claim 26 further recites refining the prediction. The Appellants argue
7 that Casati's rule adjustment is different. Appeal Br. 16. The Appellants do
8 not show the nature of the difference other than remarking that Casati's
9 workflow events are managed by a time manager. We do not see the
10 pertinence of this argument. Claim 26 does not narrow the manner in which
11 refinement occurs, or even the nature of the refinement itself. The fact that
12 Casati uses rule conditions to verify the significance of the prediction
13 inherent in the event trigger of an expected event (FF 11) certainly refines
14 the reliability of the prediction.

15

16 CONCLUSIONS OF LAW

17 The Examiner erred in rejecting claims 15-26 under 35 U.S.C. § 101 as
18 directed to non-statutory subject matter.

19 The Examiner erred in rejecting claims 21 and 22 under 35 U.S.C. § 112,
20 first paragraph, as not enabling a person of ordinary skill in the art to make
21 and use the claimed subject matter from the original disclosure.

22 The Examiner did not err in rejecting claims 15-26 under 35 U.S.C.
23 § 102(b) as anticipated by Casati.

24

1

DECISION

2 To summarize, our decision is as follows.

3 • The rejection of claims 15-26 under 35 U.S.C. § 101 as directed to
4 non-statutory subject matter is not sustained.

5 • The rejection of claims 21 and 22 under 35 U.S.C. § 112, first
6 paragraph, as not enabling a person of ordinary skill in the art to make
7 and use the claimed subject matter from the original disclosure is not
8 sustained.

9 • The rejection of claims 15-26 under 35 U.S.C. § 102(b) as anticipated
10 by Casati is sustained.

11 No time period for taking any subsequent action in connection with this
12 appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

13

14 **AFFIRMED**

15

16

17

18 mev

19

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